



# Operating Instructions

## Position Switch

> 7070/1



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## 2 General Information

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### 2.1 Manufacturer

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Am Bahnhof 30  
74638 Waldenburg, Germany

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### 2.2 Information regarding the Operating Instructions

ID NO.: 125781 / 707060300010  
Publication Code: S-BA-7070/1-01-en-29/10/2008  
We reserve the right to make technical changes without notice.

### 3 Safety Instructions

Use the position switch only for its intended purpose.

Incorrect or impermissible use or non-compliance with these instructions invalidates our warranty provision.


No changes to the device impairing its explosion protection are permitted. Mount the device only if it is clean and undamaged.

**Observe the following when using the device:**

- ▶ National safety regulations
- ▶ National accident prevention regulations
- ▶ National assembly and installation regulations
- ▶ Generally recognised technical regulations
- ▶ Safety instructions in these operating instructions
- ▶ Characteristic values and rated operating conditions on the rating and data plates
- ▶ Additional instruction plates on the device
- ▶ According to IEC/EN 61241-0, a device must not be operated with a dust layer exceeding 50 mm.

Replace the switch after each short circuit in the main circuit (the element is hermetically sealed and the state of the switching contacts cannot be checked).

Any damage can invalidate the Ex-protection!

	On request, we will send you a copy of the EC type examination certificate with the relevant annex.
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### 4 Conformity to Standards

The devices comply with the following standards and directives:

- ▶ Directive 94/9/EC
- ▶ EN 61241-0, EN 61241-1
- ▶ EN 50041
- ▶ EN 60947-5-1

The devices are approved for use in hazardous areas zones 21 and 22.

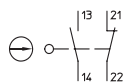
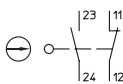
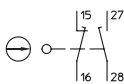
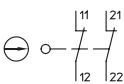
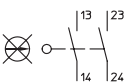
### 5 Function

The 7070/1 position switches are stationary installed equipments in hazardous areas where combustible dusts are present.

A choice of actuators is available.

They are used to switch auxiliary, control and signal circuits in areas with dust explosion hazards.

## 6 Technical Data

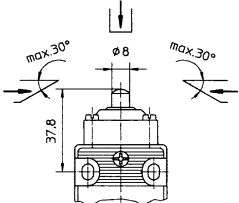
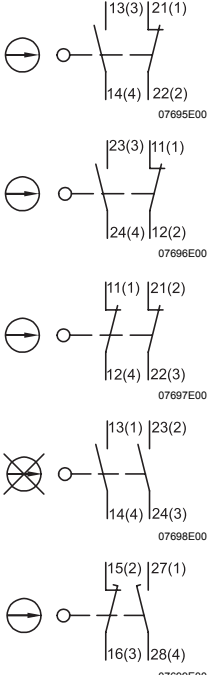
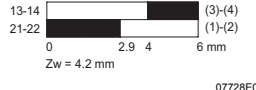
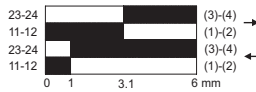
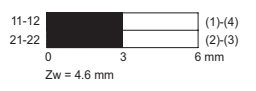
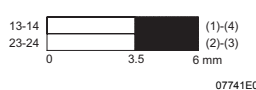
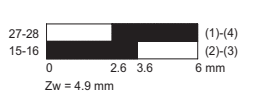
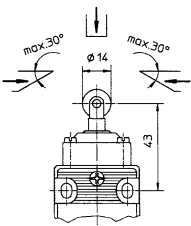
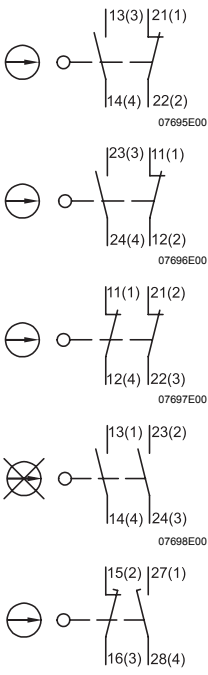
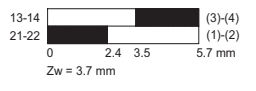

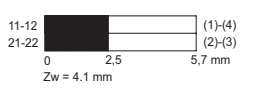
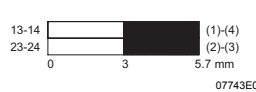
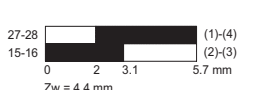
Explosion protection	II 2 D Ex tD A21 IP65 T80°C				
ATEX					
Certificates					
ATEX	PTB 06 ATEX 1020				
Rated operational voltage U <sub>e</sub>			7070/1-1 7070/1-2 7070/1-5	7070/1-3 7070/1-4	
	Alternating current for equal potential:		max. 500 V	max. 400 V	
	Alternating current for unequal potential:		max. 250 V	max. 250 V	
	Direct current:		250 V	250 V	
Rated operational current I <sub>e</sub>	max. 10 A: - 20 °C ≤ Ta ≤ + 50 °C max. 6 A: - 20 °C ≤ Ta ≤ + 70 °C				
Switching capacity	AC 12		AC 15		DC 12
	7070/1-1 7070/1-2 7070/1-5	7070/1-3 7070/1-4	7070/1-1 7070/1-2 7070/1-5	7070/1-3 7070/1-4	7070/1-.
	max. 250 V max. 500 V **) max. 10 A max. 5000 VA	max. 250 V max. 400 V **) max. 10 A max. 4000 VA	max. 250 V max. 500 V **) max. 10 A max. 1000 VA	max. 250 V max. 400 V **) max. 10 A max. 1000 VA	max. 125 V max. 10 A max. 400 W
	**) Only for equal potential				
Rated insulation voltage	550 V				
Rated impulse withstand voltage	6 kV				
Short circuit protection	10 A gL / gG				
Contact block					
Version	Slow-action contact	Snap-action contact	Slow-action contact, make before break		
	 7070/1-1	 7070/1-2	 7070/1-5		
	 7070/1-3	Attention: The positive opening function ⊕ depends on the actuator used			
	 7070/1-4				
Contact arrangement	2-pole, galvanically isolated, with double break action				
Contact opening	≥ 1.5 mm (isolating distance ≥ 3 mm)				
Contacts	Silver-nickel				
Service Life					
mechanical	max. 10 <sup>6</sup> operations				
electrical	max. 10 <sup>6</sup> operations				
Enclosure contact	Polyamide, glass fibre reinforced				
Operating temperature range	- 20 °C ... + 50 °C (10 A) - 20 °C ... + 70 °C (6 A)				
Maximum switching frequency	max. 6000 operations/h				

Ingress protection	IP65
Enclosure material	Polyamide, glass fibre reinforced, black
Cable glands	8161/5-M 20-13 8161/5-M 25-17  On the enclosure bottom: 1 x M 20 x 1.5 resp. 1 x M 25 x 1.5 On the enclosure side: 1 x M 20 x 1.5
Connection	With cable glands 8161: For plastic sheathed cable 4 x 2.5 mm <sup>2</sup> (diameter 6 ... 13 mm); recommended 4 x 1.5 mm <sup>2</sup>  With mounted connecting cable: Plastic sheathed cable HK-SO-X05VV-F-OZ 4 x 1.5 mm, cable length 6 m
Terminals	1 x 2.5 mm <sup>2</sup> or 2 x 1 mm <sup>2</sup> , single-wire / finely-stranded
Mechanical shock resistance	Snap-action contact: 2 g Slow-action contact: 20 g
Tightening torque	Screw terminals: max. 0.4 Nm Cover screws: max. 0.7 Nm Connection thread: 2.3 Nm (M 20 x 1.5) 3.0 Nm (M 25 x 1.5) Pressure screw: 1.5 Nm (M 20 x 1.5) 2.0 Nm (M 25 x 1.5)

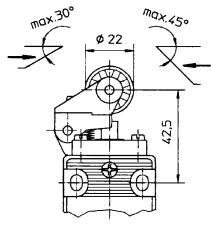
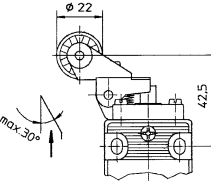
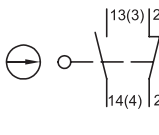
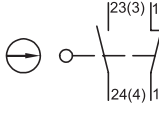
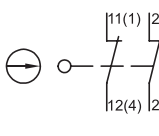
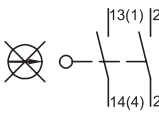
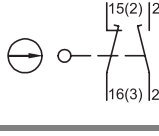
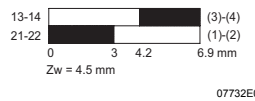

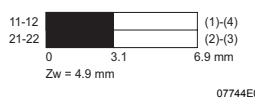
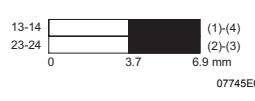
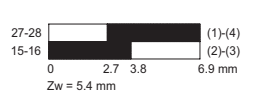
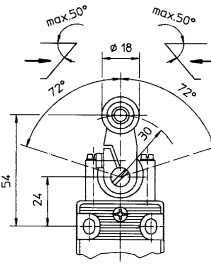
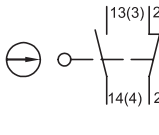
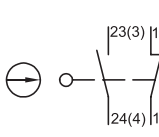
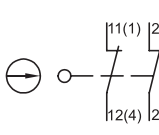
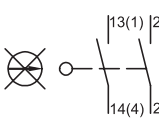
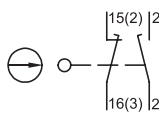
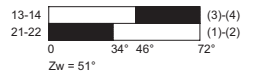
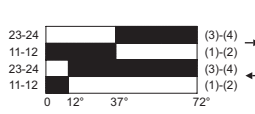
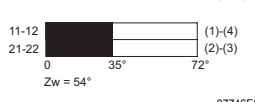
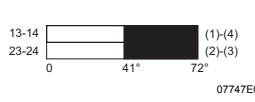
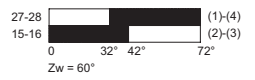


If terminal sleeves are used, they must be gas-tight and applied with a suitable tool.

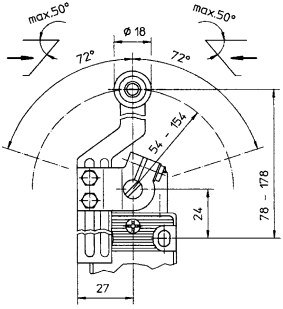
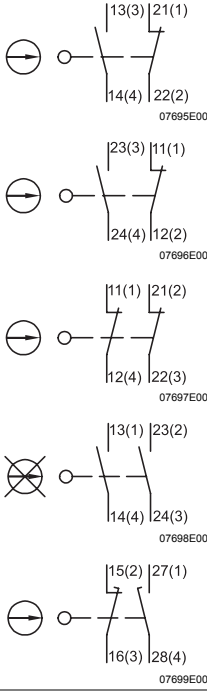
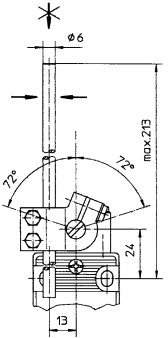
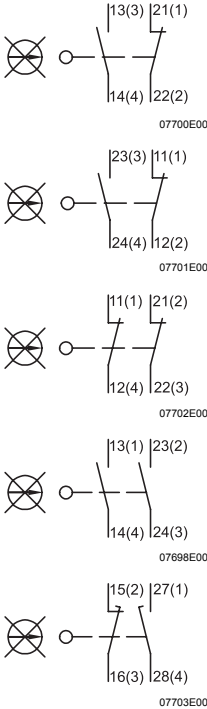
Operation, operating speed, contact travel or angle

Actuator	Operation	Diagram	Nominal contact travels or angles	Minimum force/torque
Type 7070/1	<p>V = Max. operating speed  → = Direction of operation  () = Connection for device with unconnected cable end</p>	<p>⊖ = Positive opening</p>	<p>■ = Contact closed  □ = Contact open  Zw = Travel for positive opening</p>	
Extended plunger 7070/1- . - S	 <p>Lateral operation: V = 0.5 m/s</p> <p>Operation in stroke direction: V = 0.5 m/s</p>		<p>In stroke direction</p> <p>7070/1-1: </p> <p>7070/1-2: </p> <p>7070/1-3: </p> <p>7070/1-4: </p> <p>7070/1-5: </p>	15 N
Roller plunger 7070/1- . -RS	 <p>Lateral operation: V = 0.5 m/s</p> <p>Operation in stroke direction: V = 0.5 m/s</p>		<p>In stroke direction</p> <p>7070/1-1: </p> <p>7070/1-2: </p> <p>7070/1-3: </p> <p>7070/1-4: </p> <p>7070/1-5: </p>	15 N

## Operation, operating speed, contact travel or angle

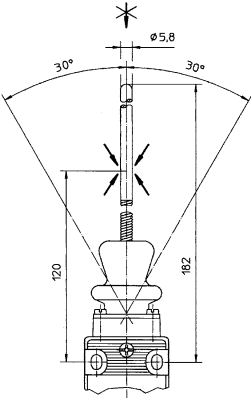
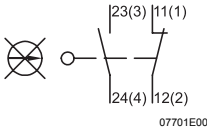

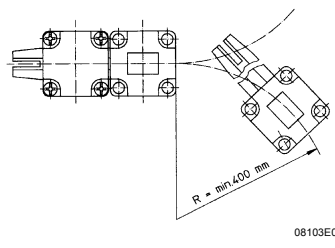
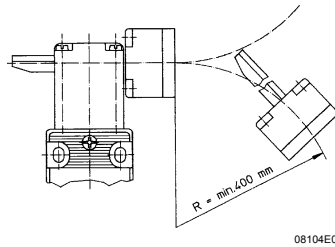
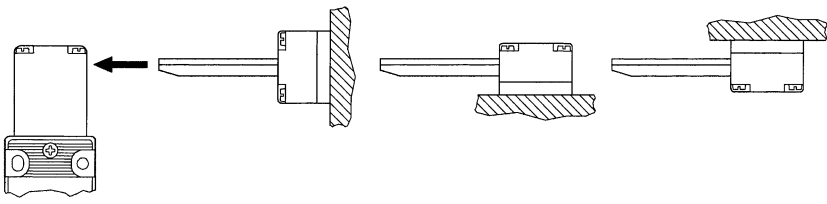
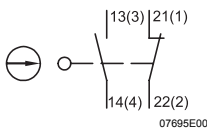
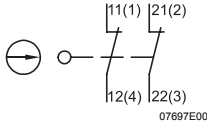
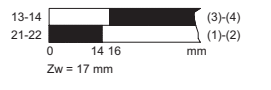
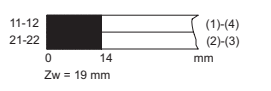
Actuator	Operation	Diagram	Nominal contact travels or angles	Minimum force/torque
Type 7070/1	$V$ = Max. operating speed $\rightarrow$ = Direction of operation () = Connection for device with unconnected cable end	$\ominus$ = Positive opening	$\blacksquare$ = Contact closed $\square$ = Contact open $Z_w$ = Travel for positive opening	
Roller lever plunger, form E 7070/1- . -AR	 <p><math>V = 1.5 \text{ m/s}</math></p>  <p>Angled roller lever made by rotating the roller lever plunger by 180°</p>	    	Movement of the roller in stroke direction of the plunger after plunger starts moving  <b>7070/1-1:</b>  <p>07732E01</p> <b>7070/1-2:</b>  <p>07750E01</p> <b>7070/1-3:</b>  <p>07744E01</p> <b>7070/1-4:</b>  <p>07745E01</p> <b>7070/1-5:</b>  <p>07733E01</p>	13 N
Swivelling roller lever, form A 7070/1- . - HR311..	 <p><math>V = 1.8 \text{ m/s}</math></p>	    	<b>7070/1-1:</b>  <p>07735E00</p> <b>7070/1-2:</b>  <p>07749E00</p> <b>7070/1-3:</b>  <p>07746E00</p> <b>7070/1-4:</b>  <p>07747E00</p> <b>7070/1-5:</b>  <p>07734E00</p>	HR311: 0.3 Nm  HR311N R: 0.1 Nm

Operation, operating speed, contact travel or angle

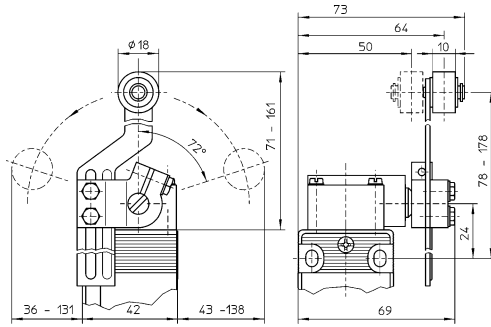
Actuator	Operation	Diagram	Nominal contact travels or angles	Minimum force/torque
Type 7070/1	<p>V = Max. operating speed  → = Direction of operation  () = Connection for device with unconnected cable end</p>	<p>⊖ = Positive opening</p>	<p>■ = Contact closed  □ = Contact open  Zw = Travel for positive opening</p>	
Adjustable roller lever 7070/1- . -HV	 <p>08100E00</p> <p>V = 1.4 m/s</p> <p>Should the adjustable roller lever swing back from an angle exceeding 40°, the lever could cause a false signal.</p>		<p>7070/1-1: 13-14 21-22 0 12° 34° 46° 72° (3)-(4) (1)-(2) Zw = 51° 07735E00</p> <p>7070/1-2: 23-24 11-12 23-24 11-12 0 12° 37° 72° (3)-(4) (1)-(2) (3)-(4) (1)-(2) Zw = 61° 07749E00</p> <p>7070/1-3: 11-12 21-22 0 35° 72° (1)-(4) (2)-(3) Zw = 54° 07746E00</p> <p>7070/1-4: 13-14 23-24 0 41° 72° (1)-(4) (2)-(3) 07747E00</p> <p>7070/1-5: 27-28 15-16 0 32° 42° 72° (1)-(4) (2)-(3) Zw = 60° 07734E00</p>	0.3 Nm
Actuating rod 7070/1- . -HH-K	 <p>08101E00</p> <p>V = 1.4 m/s</p> <p>No positive opening, not suitable for safety circuits</p>		<p>7070/1-1: 13-14 21-22 0 34° 46° 72° (3)-(4) (1)-(2) 07736E00</p> <p>7070/1-2: 23-24 11-12 23-24 11-12 0 12° 37° 72° (3)-(4) (1)-(2) (3)-(4) (1)-(2) Zw = 61° 07749E00</p> <p>7070/1-3: 11-12 21-22 0 35° 72° (1)-(4) (2)-(3) 07748E00</p> <p>7070/1-4: 13-14 23-24 0 41° 72° (1)-(4) (2)-(3) 07747E00</p> <p>7070/1-5: 27-28 15-16 0 32° 42° 72° (1)-(4) (2)-(3) 07737E00</p>	0.3 Nm



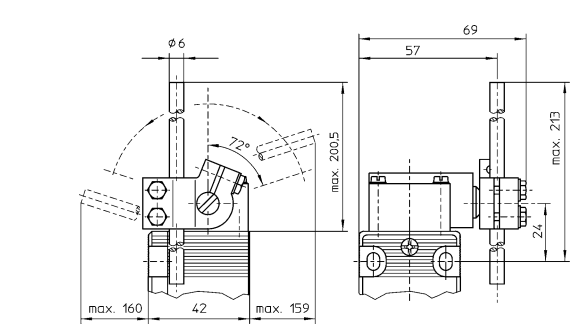
Operation, operating speed, contact travel or angle

Actuator	Operation	Diagram	Nominal contact travels or angles	Minimum force/torque
Type 7070/1	V = Max. operating speed → = Direction of operation () = Connection for device with disconnected cable end	⊖ = Positive opening	■ = Contact closed □ = Contact open Zw = Travel for positive opening	
Spring-rod actuator 7070/1-2-F2	 <p>08721E00</p> <p>No positive opening, not suitable for safety circuits</p>	 <p>07701E00</p>	Only for use with snap-action contact! - -  7070/1-2:  <p>07753E00</p>	
Safety switch with separate actuator 7070/1- . -ZB	 <p>08103E00</p>  <p>08104E00</p> <p>Do not use the switch as a mechanical stop.</p>  <p>08727E00</p> <p>The actuators can be mounted in several ways, this substantially increases the range of application of the switches.</p>	 <p>07695E00</p>  <p>07697E00</p>	7070/1-1:  <p>07739E00</p> <p>7070/1-3:</p>  <p>07738E00</p>	

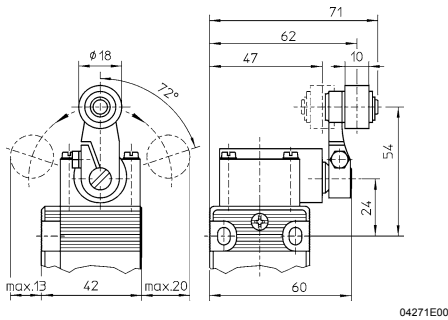
## Dimensional Drawings (All Dimensions in mm) - Subject to Alterations



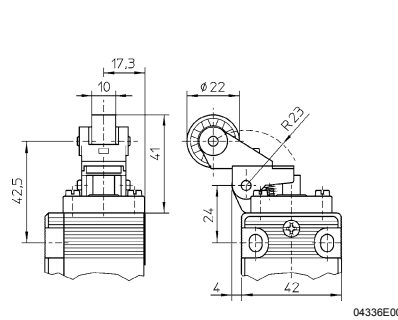
**7070/1-.-HV**  
Adjustable roller lever



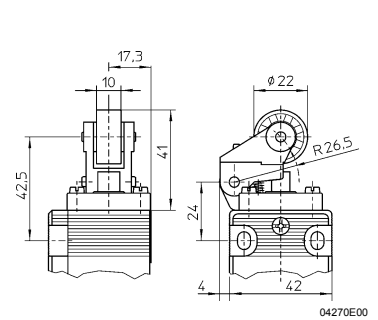
**7070/1-.-HH-K**  
Actuating rod



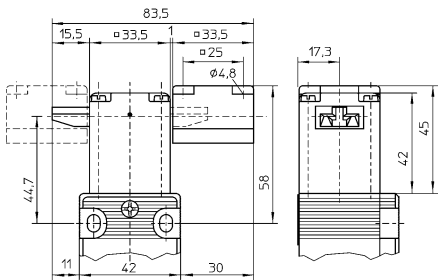
**7070/1-.-HR311..**  
Swivelling roller lever, form A



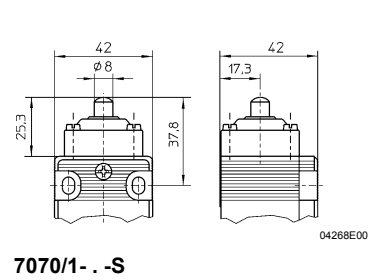
**7070/1-.-AR**  
Angled roller lever,  
form E



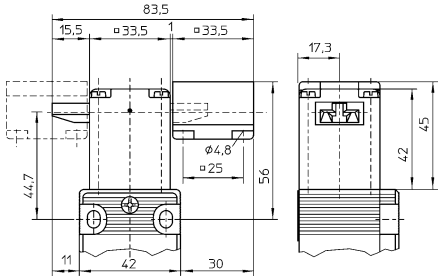
**7070/1-.-AR**  
Roller lever plunger, form E



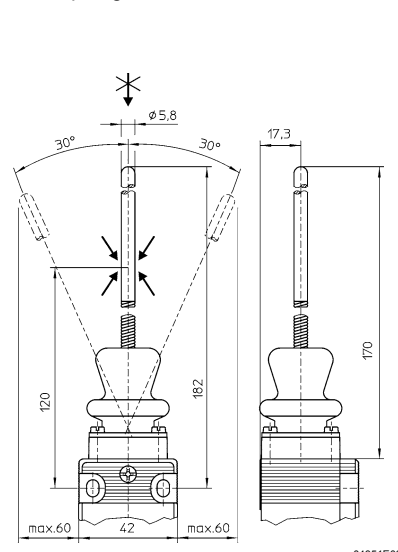
**7070/1-.-RS**  
Roller plunger



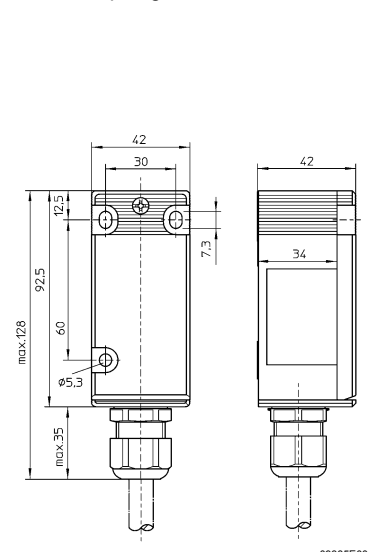
**7070/1-.-S**  
Extended plunger



**7070/1-.-ZB**  
Safety switch with separate actuator



**7070/1-2-F2**  
Spring-rod actuator



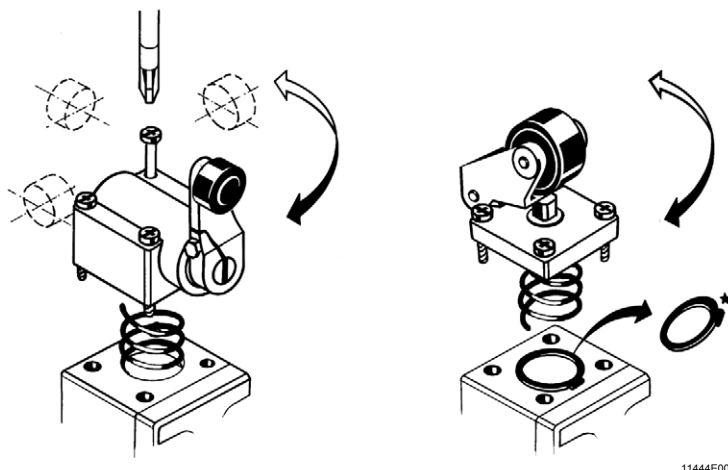
**7070/1-.-OV**  
Position switch without insert

## 7 Assembly

### **WARNING**

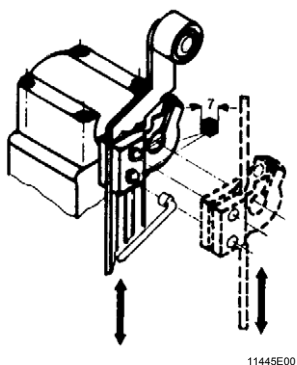
Do not use position switch as a mechanical stop.  
Secure the limit switch against position change by means of a locking device.

### Changing the actuator

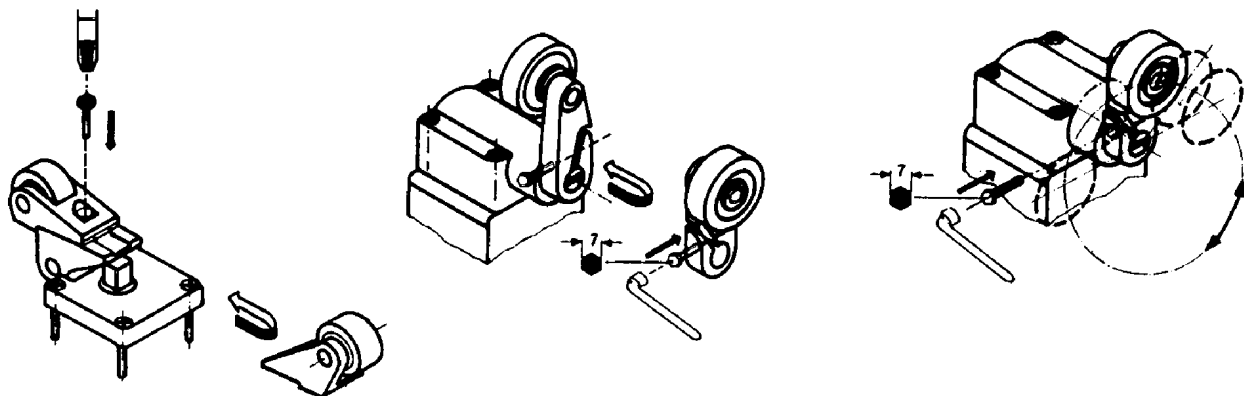


\*) Remove the flat seal from the AR actuator.

### Adjusting the lever position

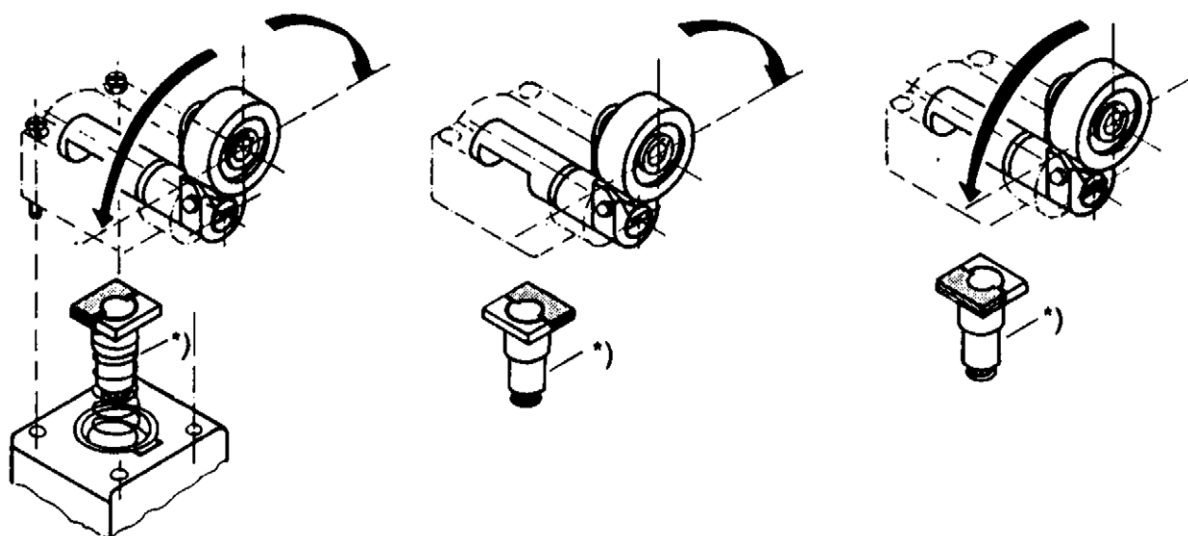


## Changing the roller lever or swivelling roller lever position



11446E00

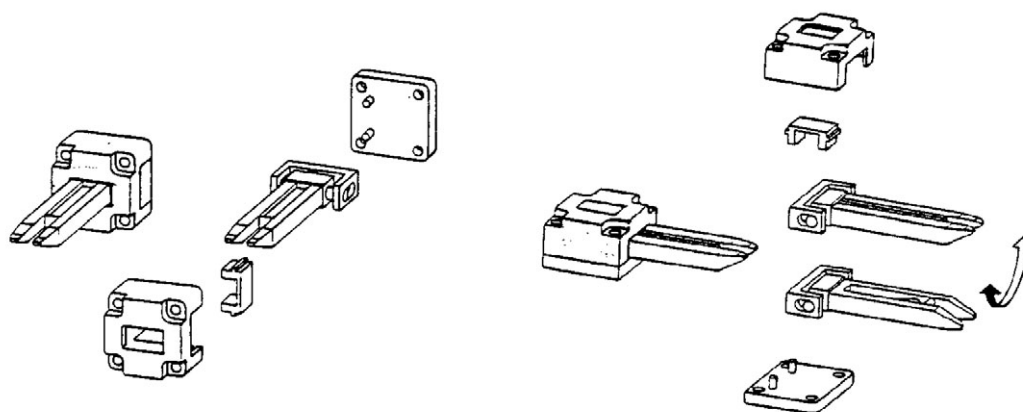
## Setting the switching direction



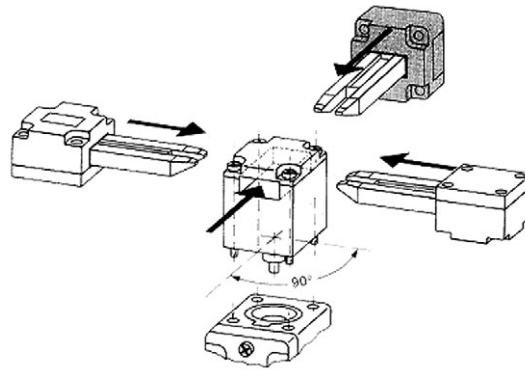
11447E00

\*) Do not dismantle the plunger

## Mounting the position switch with separate actuators (7070/1.-ZB)



11448E00

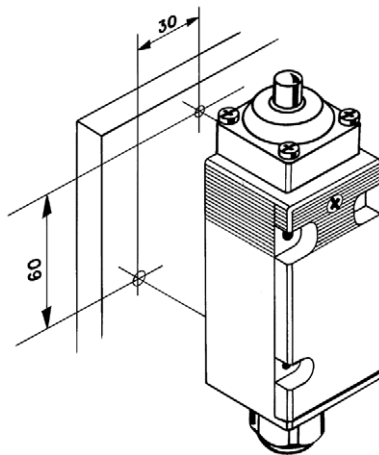


11449E00



The switching element should not be removed from its enclosure for connection. If the switching element is removed, use for example a screwdriver to press down the metal plunger while reinserting it.

**Mounting the position switch using two screws, min. M 5 x 40;  
tightening torque = 1.2 Nm**



11443E00



When explosion-protected electrical equipment is exposed to the weather, it is advisable to provide a protective cover or wall.

## 8 Transport and Storage

Transport and storage are only permitted in the original packing.

## 9 Installation

### Mains Connection

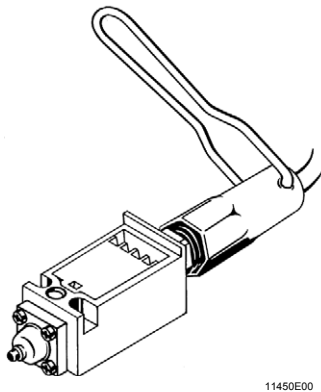
- ▶ The conductors must be carefully connected.
- ▶ The conductor insulation must reach to the terminal. The conductor itself must not be damaged (nicked) when removing the insulation.
- ▶ Ensure that the maximum permissible conductor temperatures are not exceeded by suitable selection of cables and means of running them.
- ▶ Please also refer to the terminal details in the technical data.

### Back-Up Fuse

For short-circuit protection, a back-up fuse rated at max. 10 A with tripping characteristic gL/gG according to IEC 60269-1 may be used.

### Instructions regarding cable connections and contact replacement

- ▶ Dismantle 50 mm of the wire and strip 6 mm of the conductor insulation.
- ▶ Open cover.
- ▶ Insert the wire into the cable entry and connect it to the contact.
- ▶ Close cover.
- ▶ Tighten the cable glands (tightening torque see "Technical Data").



## 10 Commissioning

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Before commissioning the device, ensure that:

- ▶ the device has been installed according to the directions
- ▶ the device is not damaged
- ▶ connections have been made correctly
- ▶ all screws and nuts are fully tightened
- ▶ the terminal compartment is clean
- ▶ there are no foreign bodies inside the device
- ▶ the cables and wires have been inserted correctly
- ▶ the cable glands and stopping plugs are securely tightened
- ▶ no part of the flameproof enclosure is damaged



Do not use the switch as a mechanical stop. Secure the limit switch against position change by means of a locking device.
---

## 11 Maintenance and Servicing

Repairs and maintenance work on the devices may only be carried out by appropriately authorised and trained personnel.

Before work commences the devices must be disconnected from the mains.

**WARNING**

Observe the relevant national regulations in the country of use!

The following points must be checked during maintenance:









- ▶ clamping screws holding the cables are securely seated
- ▶ service temperature (according to IEC/EN 61241-0)
- ▶ cracks in plastic enclosures
- ▶ damage to the gaskets

## 12 Accessories and Spare Parts




### WARNING

Use only original spare parts as well as original accessories made by R. STAHL Schaltgeräte GmbH.


Designation	Illustration		Order number	Weight kg	
Actuator	 05652E00	Extended plunger	8070/1-0-S	131805	0.044
	 05653E00	Roller plunger	8070/1-0-RS	131809	0.042
	 05653E00	Roller lever, form E (can be modified into an angled roller lever)	8070/1-0-AR	131812	0.046
	 05655E00	Swivelling roller lever, form A	8070/1-0-HR311	131815	0.099
		Swivelling roller lever, form A (swivelling lever of stainless steel)	8070/1-0-HR311NR	131841	0.099
	 05656E00	Adjustable roller lever	8070/1-0-HV	131818	0.148
	 05657E00	Actuating rod	8070/1-0-HH-K	131821	0.162
	 05658E00	Spring-rod actuator <b>Only for use with snap-action contact!</b>	8070/1-0-F2	131824	0.059
		Safety switch with separate actuator (safety operating head)	8070/1-0-ZB	131832	0.071
Safety switch with separate actuator (actuating element)		8070/1-0-ZB	131835	0.039	
Cable gland	 05864E00	8161/5-M 20-13	1 piece	138518	0.012
		8161/5-M 25-17	1 piece	138520	0.016



Designation	Illustration				Order number	Weight
Contact	 10809E00	1 NC + 1 NO	Slow-action contact	G080/1-1	132541	0.025
		2 NC	Slow-action contact	G080/1-3	132544	0.025
		2 NO	Slow-action contact	G080/1-4	132545	0.025
		1 NC + 1 NO	Slow-action contact, make before break	G080/1-5	132546	0.025
		1 NC + 1 NO	Snap-action contact, with spring	G080/1-2	132542	0.025

## 13 Disposal

Observe the national standard for refuse disposal.

	We are pleased to answer any special questions you may have. Please contact your nearest R. STAHL representative.
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## 14 EC Type Examination Certificate (Page 1)

**Physikalisch-Technische Bundesanstalt**  
Braunschweig und Berlin



(1) **EC-TYPE-EXAMINATION CERTIFICATE**  
(Translation)

(2) Equipment and Protective Systems Intended for Use in  
Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

**PTB 06 ATEX 1020**



- (4) Equipment: Position switch, type 7070/1-.....-..
- (5) Manufacturer: R.STAHL Schaltgeräte GmbH
- (6) Address: Am Bahnhof 30, 74638 Waldenburg, Germany
- (7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.
- (8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
- The examination and test results are recorded in the confidential report PTB Ex 06-15378.
- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:  
**EN 61241-0:200X** **EN 61241-1:2004**
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.
- (12) The marking of the equipment shall include the following:

**II 2 D Ex tD A21 IP 65 T 80 °C**

Zertifizierungsstelle Explosionsschutz

Braunschweig, April 11, 2006

By order:

Dr.-Ing. U. Klausmeyer  
Direktor und Professor



sheet 1/2

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig



## 15 EC Declaration of Conformity

### EG-Konformitätserklärung EC-Declaration of Conformity CE-Déclaration de Conformité



**Wir** (we; nous)

R. STAHL Schaltgeräte GmbH, Am Bahnhof 30, D-74638 Waldenburg

**7070/1-.-...**

**erklären in alleiniger Verantwortung, dass das Produkt**  
hereby declare in our sole responsibility, that the product  
déclarons de notre seule responsabilité, que le produit

**Positionsschalter**  
Position switch  
Contacts fin de course

**mit der EG-Baumusterprüfbescheinigung:**  
(under; EC-Type Examination Certificate:  
avec) Attestation d'examen CE de type:

**PTB 06 ATEX 1020**

**auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder normativen Dokumenten übereinstimmt**

which is the subject of this declaration, is in conformity with the following standard(s) or normative documents

auquel cette déclaration se rapporte, est conforme aux normes ou aux documents normatifs suivants

**Bestimmungen der Richtlinie**  
terms of the directive  
prescription de la directive

**Titel und/oder Nr. sowie Ausgabedatum der Norm**  
title and/or No. and date of issue of the standard  
titre et/ou No. ainsi que date d'émission des normes

**94/9/EG: Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen**  
94/9/EC: Equipment and protective systems intended for use in potentially explosive atmospheres  
94/9/CE: Appareils et systèmes de protection destinés à être utilisés en atmosphères explosibles

EN 61241-0:200X  
EN 61241-1:2004

**89/336/EWG: Elektromagnetische Verträglichkeit**  
89/336/EEC: Electromagnetic compatibility  
89/336/CEE: Compatibilité électromagnétique

EN 60529: 2000  
EN 60947-5-1:1997

**Qualitätssicherung Produktion:**  
Production Quality Assessment:  
Assurance Qualité Production:

**PTB 96 ATEX Q006-4**

**Kenn-Nr. der benannten Stelle / Notified Body number / N° de l'organisme de certification:** 0102

Waldenburg, 16.10.2006

i.V.

**B. Limbacher**  
**Leiter Entwicklung**  
Head of Development  
Directeur Développement

i.V.

**Dr. S. Jung**  
**Leiter Qualitätsmanagement**  
Director Quality management dept.  
Directeur dept. assurance de qualité

**Ort und Datum**  
Place and date  
lieu et date

F723.00



